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TGOSTCAOCTGCAGG0000GGG00GGGGTGTGTTTCCAOCTGGAGGTTGCTGACAOCTGTG00CTGGGCTGACTTC
CAG00GGTGGCACAGAGGCTCCAGGGGGCAGCACTCAAGGCGATCTTAGGAATGACAGAGTTG0GT00CTCTCTGTTG
CCAGGCTGGAGTTCACTGGCATGTTCTTAGCTCACTGAAGGCTCAAAAT0CTGGGTTCAAGTGAC00CT00CAOCTCAGC

	M K I K A E K N	8
CCCATGAGGAOCTGGGACTACAGGACACAGCTAAAT00CTGACA0GG	ATG AAA ATT AAA GCA GAG AAA AAC	24
E G P S R S W W Q L H W G D I A N N S G		28
GAA GGT OCT TOC AGA AGC TGG TGG CAA CTT CAC TGG GGA GAT-ATT GCA AAT AAC AGC GGG		84
N H K P P L L V F I V C L L W L K D S H		48
AAC ATG AAG CCG CCA CTC TTG GTG TTT ATT GTG TGT CTG CTG TGG TTG AAA GAC AGT CAC		144
C A P T W K D K T A I S E N L K S F S E		68
TGC GCA CCG ACT TGG AAG GAC AAA ACT GCT ATC AGT GAA AAC CTG AAG AGT TTT TCT GAG		204
V G E I D A D E E V K K A L T G I K Q M		88
GTG GGG GAG ATA GAT GCA GAT GAA GAG GTG AAG AAG GCT TTG ACT GGT ATT AAG CAA ATG		264
K I M M E R K E K E H T N L M S T L K K		108
AAA ATC ATG ATG GAA AGA AAA GAG AAG GAA CAC ACC AAT CTA ATG AGC ACC CTG AAG AAA		324
C R E E K Q E A L K L L N E V Q E H L E		128
TGC AGA GAA GAA AAG CAG GAG GCC CTG AAA CTT CTG AAT GAA GTT CAA GAA CAT CTG GAG		384
E E E R L C R E S L A D S W G E C R S C		148
GAA GAA GAA AGG CTA TGC CCG GAG TCT TTG GCA GAT TOC TGG GGT GAA TGC AGG TCT TGC		444
L E N N C M R I Y T T C Q P S W S S V K		168
CTG GAA AAT AAC TGC ATG AGA ATT TAT ACA ACC TGC CAA CCT AGC TGG TOC TCT GTG AAA		504
N K I E R F F R K I Y Q F L F P F H E D		188
AAT AAG ATT GAA CCG TTT TTC AGG AAG ATA TAT CAA TTT CTA TTT OCT TTC CAT GAA GAT		564
N E K D L P I S E K L I E E D A Q L T Q		208
AAT GAA AAA GAT CTC CCG ATC AGT GAA AAG CTC ATT GAG GAA GAT GCA CAA TTG ACC CAA		624
H E D V F S Q L T V D V N S L F N R S F		228
ATG GAG GAT GTG TTC ACC CAG TTG ACT GTG GAT GTG AAT TCT CTC TTT AAC AGG AGT TTT		684
N V F R Q N Q Q E P D Q T F Q S H F I S		248
AAC GTC TTC AGA CAG ATG CAG CAA GAG TTT GAC CAG ACT TTT CAA TCA CAT TTC ATA TCA		744
D T D L T E P Y F F P A F S K E P M T K		268
GAT ACA GAC CTA ACT GAG CCT TAC TTT TTT CCA GCT TTC TCT AAA GAG CCG ATG ACA AAA		804
A D L E Q C W D I P N F F Q L F C N F S		288
GCA GAT CTT GAG CAA TOT TGG GAC ATT CCG AAC TTC TTC CAG CTG TTT TGT AAT TTC AGT		864
V S I Y E S V S E T I T K M L K A I E D		308
GTC TCT ATT TAT GAA AGT GTC AGT GAA ACA ATT ACT AAG ATG CTG AAG GCA ATA GAA GAT		924
L P K O D K A P D H G G L I S K M L P G		328

FIG. 1A



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TTA OCA AAA CAA GAC AAA OCT OCT GAC CAC GGA GGC CTG ATT TCA AAG ATG TTA OCT GGG 984
Q D R G L C G E L D Q N L S R C F K F H 348
CAG GAC AGA GGA CTG TGT GGG GAA CTT GAC CAG AAT TTG TCA AGA TGT TTC AAA TTT CAT 1044
E K C Q K C Q A H L S E D C P D V P A L 368
GAA AAA TGC CAA AAA TGT CAG GCT CAC CTA TCT GAA GAC TGT OCT GAT GTA OCT GCT CTG 1104
H T E L D E A I R L V N V S N Q Q Y G Q 388
CAC ACA GAA TTA GAC GAG GGG ATC AGG TTG GTC AAT GTA TOC AAT CAG CAG TAT GGC CAG 1164
I L Q M T R K H L E D T A Y L V E K M R 408
ATT CTC CAG ATG AOC CGG AAG CAC TTG GAG GAC AOC GGC TAT CTG GTG GAG AAG ATG AGA 1224
G Q F G W V S E L A N Q A P E T E I I F 428
GGG CAA TTT GGC TGG GTG TCT GAA CTG GCA AAC CAG GOC OCA GAA ACA GAG ATC ATC TTT 1284
N S I Q V V P R I H E G N I S K Q D E T 448
AAT TCA ATA CAG GTA GTT OCA AGG ATT CAT GAA GGA AAT ATT TOC AAA CAA GAT GAA ACA 1344
K M T D L S I L P S S N F T L K I P L E 468
ATG ATG ACA GAC TTA AGC ATT CTG OCT TOC TCT AAT TTC ACA CTC AAG ATC OCT CTT GAA 1404
E S A E S S N F I G Y V V A K A L Q H F 488
GAA AGT GCT GAG AGT TCT AAC TTC ATT GGC TAC GTA GTG OCA AAA GOT CTA CAG CAT TTT 1464
K E H F K T W 496
AAG GAA CAT TTT AAA ACC TGG TAA 1468

GAAGATCTAATGCATCTATATOCAGTAAGTAGAATTATCTCTTCATCTGGGAOCTGGAAATCCTGAAATTAATAAGGA
TAATGCAATAAACACAGTTGCAGGAAAGTATGTTAGCTATATACTATGAAGTACTCTTAGTTTACTTATGTTCAATGGC
TTAGCTATTAATACTCAAATTGAGTTAAATGAAAATTOCTOCTTAAAAATCAAAGCTAATATGTATTACATTTTCATG
GTACATTAGTAGTTCTTTGTATATTGAATAAATACTAAATCACCTA

FIG. 1B



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TGOGTCAOCTGCAGGCGGGGCGGGGGTGGTTTCCAOCTGGAGGTTGCTGACAOCTGTGCOOCTOGGCTGACTTC
CAGGCGGTGGCAGAGGCGCTCCAGGGGGCAGCACTCAAGGCGATCTTAGGAATGACAGAGTTGGGTGCTCTGGTTG
CCAGGCTGGAGTTCACTGGCATGTTCTAGCTCACTGAAGGCTCAATTCCTGGGTTCAAGTGACCOCTCTCACTCAGC

M R T W D Y S N S G N M K P P L L V F	19
CCC ATG AGG ACC TGG GAC TAC AGT AAC AGC GGG AAC ATG AAG CCG CCA CTC TTG GTG TTT	57
I V C L L W L K D S H C A P T N K D K T	39
ATT GTG TGT CTG CTG TGG TTG AAA GAC AGT CAC TGC GCA CCC ACT TGG AAG GAC AAA ACT	117
A I S E N L K S F S E V G E I D A D E E	59
GCT ATC AGT GAA AAC CTG AAG AGT TTT TCT GAG GTG GGG GAG ATA GAT GCA GAT GAA GAG	177
V K K A L T G I K Q H K I M H E R K E K	79
GTG AAG AAG GCT TTG ACT GGT ATT AAG CAA ATG AAA ATC ATG ATG GAA AGA AAA GAG AAG	237
E H T N L M S T L K K C R E E K Q E A L	99
GAA CAC ACC AAT CTA ATG AGC ACC CTG AAG AAA TGC AGA GAA GAA AAG CAG GAG GGC CTG	297
K L L N E V Q E H L E E E E R L C R E S	119
AAA CTT CTG AAT GAA GTT CAA GAA CAT CTG GAG GAA GAA AAG CTA TGC CGG GAG TCT	357
L A D S W G E C R S C L E N N C M R I Y	139
TTG GCA GAT TCC TGG GGT GAA TGC AAG TCT TGC CTG GAA AAT AAC TGC ATG AGA ATT TAT	417
T T C Q P S W S S V K N K I E R F F R K	159
ACA ACC TGC CAA OCT AGC TGG TCC TCT GTG AAA AAT AAG ATT GAA CCG TTT TTC AGG AAG	477
I Y Q F L F P F H E D N E K D L P I S E	179
ATA TAT CAA TTT CTA TTT OCT TTC CAT GAA GAT AAT GAA AAA GAT CTC CCC ATC AGT GAA	537
K L I E E D A Q L T Q M E D V F S Q L T	199
AAG CTC ATT GAG GAA GAT GCA CAA TTG ACC CAA ATG GAG GAT GTG TTC AGC CAG TTG ACT	597
V D V N S L F N R S F N V F R Q H Q Q E	219
GTG GAT CTG AAT TCT CTC TTT AAC AGG AGT TTT AAC GTC TTC AGA CAG ATG CAG CAA GAG	657
F D Q T F Q S H F I S D T D L T E P Y F	239
TTT GAC CAG ACT TTT CAA TCA CAT TTC ATA TCA GAT ACA GAC CTA ACT GAG OCT TAC TTT	717
F P A F S K E P M T K A D L E Q C W D I	259
TTT CCA GCT TTC TCT AAA GAG CCG ATG ACA AAA GCA GAT CTT GAG CAA TGT TGG GAC ATT	777
P N F F Q L F C N F S V S I Y E S V S E	279
CCC AAC TTC TTC CAG CTG TTT TGT AAT TTC AGT GTC TCT ATT TAT GAA AGT GTC AGT GAA	837
T I T K M L K A I E D L P K Q D K A P D	299
ACA ATT ACT AAG ATG CTG AAG GCA ATA GAA GAT TTA CCA AAA CAA GAC AAA GCT OCT GAC	897
H G G L I S K M L P G Q D R G L C G E L	315
CAC GCA GGC CTG ATT TCA AAG ATG TTA OCT GGG CAG GAC AGA GGA CTG TGT GGG GAA CTT	957
D Q N L S R C F K F H E K C Q K C Q A H	335

FIG. 2A

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ACATTTTAAAGCTACTTATAGTCCTTTGGAAATAGCAACAAATATCTTAGTTATTGGACTATTATAAACCCTTAGTCATCTTATTACTGCTTG
ATTATGAGACACTCTCCCTGCTAATCCTTAGAACATCTTGGTTCTTGGTACTTGACTTTTAGCCCCCTCTGACATATAGTTGATGTCAGA
GTGCTCGGCATTTTCAGTAGTCTCTAATTTTACAAATCCCAAGTAAACTGCTCCA CTGTGGCTTGTATTGTGTTAATACTGCTTGTGTTTC
TGTTATAAATTTTGTGCTTTGGAGTAAAGATATCATCATTTTGGCATAGCTACAAATCTGAAGTTAAAGAAAATTTTAAAAAATGTAAT
TGTTGGAAAATAACAAATAGATCTGCTGAGATGGAGGCTTTGACTAATGTTTAAATAACAGGGCAACAAAACAAAGAGGCAGGATATTTT
GGTCACAACTAAACCTAAATTAATCCTCATACAAAGCCCCATTAAAGATAAATGCTCAAAATTCCTGGGAACATTTTCACTTGTGCTTTGCCAG
CAATTTTACCTTCAGAGGGGTGTGGATCTAATCAGGGGAACAAACTAACCTGCTGGCTTAAATTCATTAACAGGGACTAATTTGTGTCAAAG
CGGCAGTACTAGCTGAAGTGAATGGGTATGGAAGCATTCATCTGTGAGGATTTTGTCTGAGGTGCTGGCACAGGGTAGGGGAACCTCACCCCA
GGCTGCAAGATGCTAACAGTTTCAGGTTCAAGGTTCTTAGTGTGGACTAAGGTGCAAGTCAAGGATGGGAACAGGTGCAACTTTGGGGCCAAACAT
CAGTATGAAGGGCCTGATCTGAGGGCAGGGGAAGGAGGGGCAATCTGCGGAAGCAAGAGTTCTCTGCTGATCTCTGTTGACAGAGTCTTGG
CCCAAGGATCAACGTTATGAATTAAGTAGAAATACCAAGAAACAAAGAAAGTTGGCAGAACTAGGAGAAGCAGAGTCTCAGGCCAACTGG
ACTGGGCTCAGCCCTTGGCTACTGGCCCGGCAGATGATAGAGAGAAACCCAGGCTGAAGCCAGTGGTTGGGCTGGGCCACA
CACCATGCTAGCCCTTAAAGGGGTGGCTAAGGGCTAGGTCCGCTCCAAAGAAAGGGAAGGGGGCCCCAGAAATATTTCTGAAATCCCCACTC
ACTGCCAGGGAGAAACCTCTCAATTCACCTCAATAGTGCATTTCTCTGCTTCTCAATAGGCTAATCTCTAGAGAAATATGGGGACAAAGGG
GAGGAGGTCTAGTGGACACAGGTCTAAACTGGGCTTTTGAATTTTAAAGATAAGTTAAATCATACATTTGGCTGGGTGAGCCATGTCTCTTAG
TCTTTACAAAGTAGAACACAAATAATTCAAATGGAAATCTACAGACACCTATTTTGCAGATGAGGAACACAGGCTATGAAAGATTGGGAA
GATTTGGGAAGNACTGGCCAGGTGTGGTCTACGCCCTGTAAATCCCAAGCACTTTGGGAGGCCGAGGCTGGTGGATCACTTTGAGGTGAGGA
GTTGGAGACCCAGCCTGGGCAACATAGTAATAACCCCTGTCTCTACTCAAAATTAACAAATTCAGCAGGGGCTTTGGGTGCCACCTGTATC
CCAGCTATGACAGGAGGTGAGGCAGGACAAATCACTTGAACCTGGTAGGGGAGGTTCAGTGCCCAAAATCACGCCACTGTACTCCAG
CCTGGGTGACAGAGCAAGACTTTGTTTAAATAAATAAAGGAAGAACTAAATAATGTAATTTTCAAGGGGCTATCACAAATGGT
CCCAATAAAGAGAAAGCAGGACTCATGTTTAAAGAAACCCATGAGATGTGTATGGACCTCATGGAAGAGCTCTTGTCTTCTAATGATCTA
CGTAAACAGATGAAGAGCAGAGCATAGGGCTAAGGATGAAATAACACAGTAAATAAGGTATTAATATATATTATTAAGAAAGCTAATGCTCC

FIG. 3A

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FIG. 3D

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FIG. 3G

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AATAGTACATTTGACAGAGAAATTTGGGGAATCAAAAGTCTGTGAGACCAGCAAGATAAATAAGGCCAAAAGGATACAAAACCATATCCAA
AGAGAAATGGTTTAAAGGAACATAAGGCTGTTTCTCTAAAGAAATAAGTTGGAGACATGTGAOCCTCCAAAGAAACACAGGACTTTTCT
ATGGGGCTCCAAGGGGTTTCTATGAGAGAAATGATAAAGGAGAGATTTTCAGCTTAGTCTCAGGAAGACTTTTCAACAAACCAAAACCTGCCC
AAAGATGGAATGCCCCCTGCTAAGGATTTGTGTTCTGACATTAAGGGTATGGAGGTATGGGTAGATGAATAATTTTACCAAAATGCCATAG
ATATTTCCAGGCTATTTGATGTTGTAATATCATACTAGGCAACTCCCACTTCAATATGAGTCTCTATGATGTAAATGAAATAGGATGTGTT
TCGATAGAGAGTTGCAGATTTTCAATTTTGAATGAGGACCAACAAATTAATTTTCCCTACATAAGAAACATGTTATTAATCTAGTTGAT
GATGACTGCTTATGGGAAATGCTCTGCTTTGTTAGGAAATCTTTGCCCTAATATATGTATTAATTCAAAGATGGTATTTATAAAGTGACATATA
TGATTTTAAACATTTGCACTTAAATAAACAATTTCTGTACCATGMASTGTCTAGGAGCTTCTACATAATTCATTCCATTATTTATTTATTT
ACAAAGACAGGGAACTAAAGGCATGGAGAGATTGAGTAATTTTGTGCAATATTAATCTACCTAGTAAGTGTAAAGGAAAGATTGGAAACCCAT
TCTGGCTCCAGGATCCAGGCTCAAAGCCAAATATACTATCCACCAACCCCAACTCTTTAGTTTGTATCAATTTGTCAAAATTTATTTTACAGTT
ATTTATCTGTAAATTAAGGGGATTAATTTGCCAGTCAATAAATGTGTGCCCTTCAAAGGTTACATACTTAACCAATGGTGCTACTGGGCT
CAGAACATTTTGGAACTACGATTTTGGTGGCAACCAAAACCTCCAGTACATTTCTCTGAAACATTTCTCCAGAGGCAAGTCTTCTTCTCC
ATGGAGACTGGGCTTCAATTTTGTAAATTAAGCTGAAAGTTGTTGAGGTCAAAATCTGATGAATAAGAGGGGCTGGGGAAGCTGGATATTTT
CGTTCTGTGATTTAAACACAGTAAATGCCACCTAAATGAGAAAGGCTACTTTCTTTTGAATGTTTGTAAACCTGGCTTTTGAAGTACTTCTTT
AAAAAGAAAGCACAAAGAACGAGTGAATGGCAACAGCCCTCAGTGAATAAGTCTTAATCAATCAAGGCAACCCACACTCATTTGGATG
TGTGCATCCGGTGAATGTTATTTTAAAGTTATGTGCCACAAAGATGCAATTTCTTTGCTATAACAAAGAGCTGTTGTTAAATTTATAA
AGATATAAAAGGGGAAGGAGAAAGGCAACCAATGGAAAGATTTCTTAGGCAATTAAGTCTCAGACAGCATAGATCTTTCATTAGATGAAGT
CAGGGAGAAAGAGACACAGACTTTTGCCATCTCAGGTAGAAAGTATCAAAAGTCAATCAGCCCTCTAGTAAGACAGACAGCTGGGTTTGAAGCTCT
GCACAGCCATTTCTAGCTGGTCTGGGGAAATTAATTTCTTTGAAGCTCAGTGTCTTTATTTTGTAAAGTAAGTGAATATATATTAACCT
TGTCAAGGATGTTGTCAGAAATTAAGAAATTAATTTAAAGAGGTCCAGCACGAGCAGGTCAATCAAGGGAAGATGTTAAATAACAAACAGGT
GAAATGTACTCCCAAAAGATAAAGTGGATACATAGATGAATCTTCTCTCACACAGAGATATAATAACCTCAGAAATAATTTGCCCTAGAG
TAAACATGCTCTCCCAAGCCAAAGTTCATCATCCAGGAATACGGAGAGGATGTTTGGGATATGGGGGGCATGAATTTTACAAATTTGTAGG



FIG. 3H

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FIG. 3K

CAATAGGAAATAAATTATTGAAATAGAGGAAGAGACAGGTAAATAAGGTATACACAAAGTAGAATGGGGCAATAAATGGCGCATTT
TCGCACCATCAAGAGTGCCCATGTAAACAGAGATAAGTAATGCATCTTGAGCTGAACACACTGAAGGATAAGAAACAAGGGGAGAAAGAC
CTAGAAGGGGCAATATACAGCAAGGAGGAAATAAACTACTGTGCATTCATGCCAGTCTTAGCATTTAGGACATCTCGGAAGCTAGAGG
TGGAGTGGAAAGAGGAGAGTGTATAGGAGCTGGGGTCAGAGAGTTTCAGGGTGGGGAAGGTCTTCGACGAGCCTTGTAGGTAATTGTAA
GCATTTGGATTTTATTCTGAGGGTCACCTGGGGTGCTATTAGAGACTTTTGAGCAAAGAGGTACATGCTCTGACTGAACCTTTATTCTCTGTG
AACAAATCAGAAATCAACTAGATGGATTTAAAGTATGGGTATACCATGAAAGAAATTTACTTAAGATCCTTGCTACTCAAAAGTATGAGCCAG
GACCAGCTACACTGGCATMAGCTGGGAACCTTGTAGAAATGCAGAAATCCCAAGTCCCGAGACAAACTGAATCAGAAACCTGCACTTTAA
CAAGATCCAGGTGGCCCATTTGTATGGTAGAGTTTAAAGCATTTGGTTTAAAGATCCCTCTTGATAGAGCATGGAAAGATACATTT
GAGACAGAAATAGACAAGTCAGAGACAGGTGGGAAGGGCCATAAAACAGGGCAGAAAGTAGGGAGGTAAATGAGGAGACAAATACAAAGGAA
GAAATGCACAGCAGGTAGACAAATTCCTAAATACTTAAAAAAATTTTTTTTTTGAATTAATGATAGATTCAAGAGGTTGCAAAAGAA
ATGCGTAGGGAAACAATGCACCCCTTTACCCAGCCTCTCCATCAATTAACATCTTATGCAACTATATTAATAATCGAAAAACAATCAA
GTGACATTGCTACAAACCATAGAGCTTATTCAGATTTCACCCAGTTATTAGATGCACTCGTGTGTGTATGCAATATAGCTCTGTGTAA
TTTTATCATATGTGAAGCTTTGCTACCAATCAAGATATTCAAGCCATTAGCAGAAAGATTTTCTGTGTGTACCTCTTATAGCCACAG
CATTCCTCATTAACCCCTGGGAACAATACTGTTCATCTCTATAATTATTCTATTTCACGAACATTTTGTAGATGGGTACATG
CAGTGTGTATCTTTTGGGATTGGTAAACAGAGCAAGACAGGATCTCACTGTCAACCCAGGCTGGAGTGCAGTGTCTGTGATCTTGGCTCA
TTGCAGCCTCCACCTCTCGGCTCAGGTGATCTCTCCACCCAGCCTCTGAGTAGCTGGGACTACAGACACACAGCCCTCAGCCTGGC
TAATTTTGTATTTTATATGATGGGTTTCAACATTTTGGCTAGGCTAGTCTAGAACTCTCTGGGCTCAAGTGTATCCAAACCGCCTTG
GCCTCCCAAAATGCTGGGAGTACAGGCATGAGCCACCACTCCACAGCTTTTCATTCATACATCTTCTTTGAAGTTTCATCCAAAGTTGTG
TGATCAATPACTTCACTCTCTCCAGTTGCTGAGTAGTATTCCATGGCTTGAGGTGCTAGAGTTTATTCATCAATCACAATCCCAATTGAA
GGMCAATTTGGGTGGCTTCCAGTTTCCAGTTTGGGCTATTATGAACAAAGTTACTATGAACATTCATATACAAATGGATACATTTTGT
TGAAATGAATGGAATAGATGGATAGGATTTAGTGATCAGCTATGTGGGATGAAGAGTGGCATAAAGTAGTAAAGTAACCCCTCAATGCA
ATGTGCAGCCAGCAAGTACCACAAAAAGAGTTTATTTGTTCATACATATATTTCTATATATACATACACACACTTTTATTAATAACCA
AATAGTATCCTTTTCAATGAACACAGTAATTTAAACATAAACTATGAACCTTAAAGTAAACTTGACAAACAGTGTGTCAGAAAT

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FIG. 3L

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TTTTTGTCTCTAGGTCAGTTAGGTCGTCTGTCTTATCTTTATGACCAGGAAGAACTAGGTACCTGACATCAAAAGAAATGAGTGGCATAG
AATTTTATTAAGCAAAAAGGAAAGCTCTCAGGAAAGAGTGGGGTCTTGAAAGCAGGTTGCTGTTGCCCTTTCGTAGTTGAATACAAGGG
CTTCTATATAAAACCTGATGGGGCCGAGTTCCCTGTTCGTATAAAGCATGAAATTCCTGGTGGCTCCAACGCCCTCCCCCAGTGGGTATG
TGGGACCTTCGTGCCACTAGGGACATGTATTAGACAAGCTCCCTGTGCAAGTTCCTTATCTGCAAAAACATGGGTTGGAGGTTCTCCGG
GGACCCCTTCCTTTACTTTCTGCCCTAAAGCAAGCTGGCTAACTCCTTTCAACAATACTAAAGACATACAGACAATGGTTCCTCAGTACAAAT
CAATTTAAATAATTTAAGTAAACCTTAAATGGTGTGTTGTTGATTTTGACATTTTAAAGATATCGCTGTTCTTAAATAATCTGTGTTTTT
AGTTGTTGGGCTCTCTTCTCAAAATGTGCTATTTACTATTAAGCATTTCTGTATCATGGCATTCCTCAAAATAGTTTAAATTAATCTTTT
AATTTGAAGAAAGGAAACATTTCTGTACAGTCACGGAAAGTGTCAAAAATGAATAATGAGGCAAGGTGTGGTGGCTCAGCCCTGTAATCTCCG
CACTTTGGGAGGCCCTAGGTGGGTGGATTGCTTTGAGCCCTAAGAAATTTGAGACCAAGCCCTGGGCAATATGGTATAACCCCTGTGTGTACAAAA
AATACAAAATTTAGCCAGGTGTGGTGGCCCAAGCCCTGTAGTCCAGCTACTTTGGGAAGTTAGGTGGGAAATCTTAGGTGACAGAAATGA
GACCTTGTCTCAAAAATAAAGAAATAAAGAAATGATAAAGGATACATATCAGGAAACATGCAATGCTGTTATTTGTATCATCTACTTTA
GAGTAATTCAGTATAGTGGTTTCTTTGTTGTTGTTGTTTATTTTGTAGAAAGGGTCTTGGCTGTCAACCCAGGCTGGAGTGCAGTG
GTACGATCTTGGCTCACTGCAACCTCCGCTACCAGGTTCAAGCCATCTCTCCCAACTCAGCTCCAGAGTAGCTGGGACTACAGGTGTG
CGCCACCAATGTCCAGATAAATTTTGTATTTTGTGTAGAGATGGGATTTTGGCATGTGGCTGAATGCCCTGGCTCAAGCAATCCACCCCTC
CTCAGCCCTCCCAAGTGTGGGATTCAGGGCTGAGGCCACCAACACCCAGCCCTCAGTGTAGTGTGTTTTTCTTTTCTTTTATTTCTATG
TTTTTAATGAATTTTACAGTTACCCAAATGTTTCCCTAGTTTCTGCTTCCAAAGATCACTCTGGAAGAAATATTTAAAGAAATATATACCAAT
AAGAATATGCAAGTCTCCCTAAGGGTGGCAGGAAGAACACCCCTCCCTCCAGATGGTATTTAGGGCTCTGGCTGGGAACGGCTTCCC
CATGCTCTAGGTCAGGGTCTCTCTTGGCATGACACTACCAACAGTGCAGACCCCAAGGGGAGAAAGGACGGGCCACAGTCCCTCA
ATCCCTCTTTTCCAAAGATGTGCACAGCCCTGACTCTCTAACTCTCCCACTGACTCTAGGGGAAATAACAGCAAGGGCAGGAAACGATTT
TCCATGTCAACCAACCTTTCTCTGTGAGGGAAACCTACTGGCCACCTCTCTCTTTAGGACCAAGCCCATCTGTCCCAACAGCTGGAAAGTCCAGCTTC
CGTTCAAAATCGGAGTTCTTTCTTCATGACATTTCTTTGCAAAAGTCCCGGAAACCCACAGCTCTGAGACTCTGGCTGTCCCCCAACCCACCC
CCAATCTCTCTGCTCAGCCCTGGTCAGGAGAGGCCAAACATCAGTCAGCTTCCAGTAAATCAAGCCCTGGCTTTCTCAGCCAGGGCT
CGCCCCAGAACCAACCCGGCTTCTTTTCAGTGTAGCCCAAAAGGCTATTGGAGTCTCTCTCAAAATGAAAGAGATTTTATCAAAAGGCTTGA
GAAGAAAGAAAGAGGATTTATATAATAAAGCTAATAAACAACAAACATATACACAAACAAATAAATCAACCTGAGATATGATTTCTCCCC



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FIG. 3N

ATTATTAAGACATGCNTATAAATTACTTGACCATTATAATACCATTAATAATCTAAATCTATTTCTTTATCTGTCCTCAATAATCCACA
GAGTCAGCACACAAGGATTCTTTTTCATATATAGGCTGAGTATTCCTTATCTTACATGCGTGAGCCCAAAAGTGTTCAGGTTCTGGA
TGTTTTGGGATTTTGAAATATTTGCAATATACAAATGAGATATCTTGGGGATAGAACCTACATCTAAACACAAAATTCATTTATGTTTC
ATATACACCTTATACACGTAGCCTGAAGGTAAATTTTACCAATATTTTAAATAATTTTCCACATAAACAAAGTTTGTATACATTGAAC
CATCAGGAAGCAAGGTGTCCTCAGCCACCCACAAGGACACTCTGTGATGTTGTCTTTCATTCCTGATTCCTGAAATTTATACGCTACT
GACAAAGCAATCATTTTCTTACACTTATTCACACACAAAGCACTTAGTAAATAATATGACATATATCTGGCATGCTCAGAAAAGCTATT
TTGCAGCAGAAAGGAGCTGGGAGGCTCTTTTTCCTTGGGACACCGGAATAAATTTGTGTATTAATGTGCCCTGCTGCAATTTTGACTGTGAC
CCCATCACATGAGGTTAAGTGTAGAAATTTTCCACTTGTCTCTCTGTCTTAAAGTTTAGATTTGGCCAGGCATGGTGGCTCATGGCTG
CAATCCCATCACTTTAGGAGGCCAAAGCAGGTGGGTCAATTTGAGGTCAGGAGTCAAAACCCAGCTGGCCCAACATGGTGAAACCCCTGTCT
CTACTAAATAAATAAGTTAGCCTGGCATGTTGGTGCAATGCTTGTAAATCCAGCTACTCGGAGGCCGAGGCGAGGAGATCTCTTTGAA
CCTGGGAGGCAGAGGTTGCAGAGCAGAGATCACTCCATTGCCACTCCAGCCTGGGTGACAAAGCGAGACTCTGTCTCAAAATAAATAA
AAAAAAAGGTTAGATTTTGGAGCATTTTGGATTTTGGCATTAAGTGTGTTCAAGCTGAAAGAAATTCOGATTTGCTCAGGA
CAACTTAAACAAACAGTGAGATATTTCCAACTATATATATGCTCTCTCTATTTCCCTTAAATTAATTTTGGACTTGGAAACAACCTTG
GCCAATTATGAGGATGAGACTTAAATGTTACTGTACAGGGATAGAACGATTCATTCCTCTATGTTATCAAAATACTTATGGTA
TTTTTHOCCATCCTGCTGTCATGCGAGATCCAAAGAAOCCAAATTAATAACACATTTTGGCGGGTCAATAATAATGTGGCCAGAAATTAAGAA
AACTTGATTTTAAATTAATGATGATTTTGTCTGTTTGTAGTCTACCGATTTTCTATTTGCTTTTAGCTTACTCAAAATAAAGCGCGGCACTT
CGAAGACTCAATAGTCTTCCATTCATGTGGGCTTTTATAATGCCACGGGCCAGATGCAATACATCTGGGGTCTGCTTGGGTTGGCCAC
TGGATTGAAGGAGGCAGAGAACTCTGGGATGATTTCCCAAAATGTCTGGATCTGGTGAACAGGGAGATATGGCAGGGGAGCTTAGGGGAAA
AAGCTGGGTTAGGAACTGTTGAAACTGAAATCCCTGAGGSYTKTGCCGACAGAGAGACAGCCGGTAGAAGGTTGTCTTTGCTGTCTGT
GGTTCAGGTAACTTTCATCGAAAGAGAGTTTCAGGCGAGTAGAAATAAGAGCAACCCAGGACAAAGCCCCAGGAAAGAGAAACATCTGACG
GAGGACAGAGGAAGGGTTCAGGAATGAGACTGAGCAGGTGTCTATGTCTGACACACAGAGCCTGACACATAGTACGTAGTAGACACT
CAGCAAAATACCGTAACAGAGATGAATCCAAAGGCTGGGGAGGTGGTCAAGCCTGTAAATCCCAACACCTTGAGAGGCCCTAAGTGGGAGG
ATCTCTTGAGTCCAGGAGTTGAGAGCCAGCCTGGGAAACATGGTGAGACCTTGGCTCTTAAATAAATAAATAAATAAATAAATAAAGA
GATGAATGCAATACCTGGCTGCTGGAGCCAAACATGGGTTGGGTGAGCCCACTCTTACCAGCAGCTAATCAAAATAATTTGCTGGAATTTCT

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FIG. 3Q

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GAAAGTGMCCGGWTTCAATGAAGTATTGCTTAACTCTTAAGAACAAAATGGCAGCTGTGAAAAACAGATGAAGTAATTAGAGGAAGAGCC
TTTTTGGGAAGCTTCGAGATATTTTCAAAGTAATTAGTACTAGTTAGCAATAAAGTTCTGTCTGAGAAATTGCTCTTAAAGGAGGAACA
TGGATTAAAGAAAAAATCTGCTACTAGGAAGTAAGCCATCTTCTCTATGTGTGATGTTGGTTTGTCTTCTCTGAAAACTGGTTCCGTTTTT
CAACAAAATTTGGGCTCTGTGAAAAAGAAACCGCAGATGCCAGCCTTGATGTCAAAACGGGGCCCAAACTTGGACAGTGGTAAACTTAATGA
GCAATGGTGACAGAGTCAGGGTAAAGCTGGACAAATTTCTCTATGACCAACTTTTCCAGGACTCTGCTCTGCTCTCTCTCTGAGAAAAATA
CCCCAAGTGTGCTCTTCCATTTGGCCCAACCATGCACTCTTTCAGGATAGGMCACATCTCTGTTTATAGGTGTGGATTTGTAGTTGCTCATA
AGTGACATTAGGCTGTTTAAANAATAAATAGTTTCGAGTTTTCGCTATGAGCTGATCTGTGTTTCCAAAGAGAGCTAAGAGTTTTCAGCTAA
AAGAGGGAATTAGTGGGTAAATCAAGGCAGCTGACATGGGGTGTGGCTGGCCCTTGAAATGTGTCTCACTCTCTGTGCCCCAGGCAGAGCAA
AGATAAACTCCAGACTGCTGTCTCAGAGAACAGGACCAACGTCATAGGGCGCCTAAAAGGCAGGTGGCCCACTCTCAGAAATTTGTCAA
GGTCTGACCTGTGTGGACAAAGTGTGCTGAGTACATAGTAAGGATGGATTGGCTAGTCTCTCAAAACTTGCAAAACAGGGCGCAGGTGATCTT
GAGATTTCCAGGTGCCGGAGAGACCCATCGTGTAGATTCCAGAGTTGGCTATCATGACTAACAGCTGTCTAAGTTGTTTAAATGAATC
ATTAAGGGCTACATTTTTCAGTTTCAGCTAATCAAGTAGCAAAATTAACGGTGGGTCTAAATACTTATCTATGTGCATTTATGTATATGCTAGA
CTTTATCAGCTTTAGTTGGTTATATCGCTTTTATCTAAGAGTTTACTCACTTTCACATTTGTGGCTTATAGTATTTTCAATCTAAGAGACTAA
CTGTGTAAATAACACTTTTCAAACCTGTTTATCTAAGAGTTTACTCACTTTCACATTTGTGGCTTATAGTATTTTCAATCTAAGAGACTAA
TTTTTGCTTACATAGGAACTACATATTTTAAATTGAAATTTAAATAATTTTAAAGGTTTAAATGAGTCTCTATCAAAACACATTTGT
ATATAGGAAGGTAGCCCAAGGTCACTGTTGCCAATTGTGTACACAGCCTGCCCTTTAGTGTCTTCTTCTAAACAGCACCAAAATTTTGA
TCATAGTTGTAAATCTCAAAATGTTGGGTTAATAGGATTAACACACTGTGTCTCATCAAAATTCATAGGACACAGCTAAATCCCTGACACGGG
TGAAAAATTAAGCAGAGAAAACGAAAGGTCTCTCCAGTAGCTGGTGGCAACTTCACTGGGGGAGTATTTGCMAAGTTAGTGTGTAATAACA
CTATATTAATAAAGTTTTTGTAAATAGAGTAATGATAGAAAGAGATTAGTTGAAATGATGTATGTAAATAATGTGATAACTGCATAA
TTACTAGTACAGTTGCTAGTTTACGACTGTATTAATAAAGACATTTCCAAATGTTGATCAAAATAATGGAGGTTTCTGTGGTTGTTTTCTTT
TTAAAAATAGTAATAATACGTAAAGCAGATAAATAATCCCTTTTGTGGGAGTTAAATAATCTAACTTATTTTATAGTTTAACTTTTATTA
AAGCATACGACTATTCTAACTTATTTTAACTTTTCTTAGTAAGTTTTTAACTCTGTATTTTAGAATATTTGTAACTAAATGTGTATCGAAT
TAAACTCAAAAGGGAAATTCATTAACCTGAGAAAGAAAAATTTTAACTGTGTGCACTATTTCACATAGCATAAATGGGTTTTTATATAGGAGTATGA

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FIG. 35

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AGCAGGTACAGTCAATTGAAATAAATGCTCTGTTCTTTACACAGATCTGGACCAGAAATACCTGCACCTTGTATTAGTGGATTGATGAATTTACTCTT
ATTTTCCCTTAGTAAATAAATTTTCATGGGTAGCTGCTTTTATTGTAGGAAAGTTTAAAGGGAAAGCTTCACAGATTTCCCTTGAAGNACATATATTT
CGTGTAGGATAGGCTTCTGCAAGACTCCAAACCCGGAATCTGGGGGATTTCATCTCTGTTTAAAGTGTGCTTTCTCTCAAAAATAGATTATATTC
TTGGTCTCTTCTGAGTTAGGATATTGAGTCAAAAGTATTGTGAAGATTTTTTTTTTTACTAGATCAGTGGTCTCCAGAGTTTGTGTGTTTT
TTGTTTTTTTGTGTTCTGTTTTTTTGAGACAGAGTCTCGCTCTGTCAACCCAGGCTGGAGTTGATCCCGCTCATTTGCAACCTCCACCTCC
TGGGTTCAAGGTGATTCTCTGCTCAGCCTCCCTAGTAGCTGGATTACAGGCTCCTACCAACCAACGCTGGCTAAATTTTTTGTATTTTTTTA
GAAGAGACGGGGTTTTCAACATGCTGGCCAGGCTGGTCCCGAACTCTGGGGCTCAAGTGATCCACCTGCCTCAGCCTCCCAAGTGGCTGG
AATTACAGGCCATGGACCAACCGTGCCTGGCCAGAGATTTTTTGGTCTCTCATCTCCTATGACTAAAAAATTTTGTATCCACTCACTCCTCTAAA
TATATGCAATATTCATTTACTCATGAATTAGATACATGAATTGCTACCAATTGATATCTCAAGGCACAATATGTATTTTAAAGGTGAGATTCA
TCATTAGCGAGTGTGGATATAAGTCCACATTTTCAATAATCTTCTAGATATTTTGAACCTTTTAGCCGACTTGCAGATCTGTATTAGAT
CACCATAGTTTTCCCTTGTCTACTTGGCCAAATAAGAGCTCATAAATGATCAAGTGTGAGCTCTGOCATTTTGTCTTTTGGTCCGCTTGAGCT
TAAATATTTCATTTTTTAAAAATCTGCCAAGTTTTTTTTTTTCAAGAAATCTTGTTAAGCCTCCTGTCCATTTTAGTGAAGGTTACTTTTA
GTTAAAACTAGATAATAAATCCATCAGTCTACCTGAGTCTCTTACATGGCAACTCATTAACAATGGGTGCATGTGAACAGAGCAAGG
GAACTATAGTTGATTCTTCTGGAATGTAGAGGATCCCCCTTTTCCCAAGGTCTACATACAGTTGGGCACACACAGTATCTGACATAT
GCATCTCAAGAGAGTACCATGTATATCCAAATAATGCATCAGCCTAATCACTTTTTTTCMAATTCMAATAGCTTTATTTAACAGCTATAGCT
TGAACTACATATTTTATCCATGGAGAAATACATATTATATTCAAAATGTCCTTTGGGAAGATGTAAAAAATTTGTTCATATATGCCACAGTATAAA
GTTCAGTAAATTTCTAAATTTATAGACANTGAATAGCTTGCAGTTTAAATGACATTAATTAATCAATCACTCAAAAACAATGACTTTTTT
TAAAAAAGGTTATCTTCAMCATTTMCCCTTAAATCAAAAGAGGAAATTAATAAATCTGTAAACAAAAATTAATTTTGGAAAAATATTTTCAATTTTA
ATGTTGAGAGATAAATTAATTTTTTAAATKTAATTTTTTATTTTTTGAATAAATGTTGTAAAAATACATATAACAAAAATTTTACCATCATATA
ACCAATTTTTAAGTGTAAACCAATGCCCATTTCCCCCAACCCAGTCAGATTTTTTAAATTTTAAAAATACAAGTGGAAAGTTCTAATATTTT
TGAAAGTCTATACATATTAACAATGCCCATTTGGGGCCACTGAATTTCCAGATTTGCTGCTTGTCACTTTTTTACTTCTGAGCATCATGGCCTCTG
TCTATCTATCCCTCTATCTATAAAGTTGGGGCCACTGAATTTCCAGATTTGCTGCTTGTCACTTTTTTACTTCTGAGCATCATGGCCTCTG
GGAGTCCGTTTAAGCAACTGGAGCCGGGTAGTGTGACAGGCTGACCCCAAGCTGTGTGTGACGGGTCAACGGGACTGGTTGATGTTGCGAGC



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FIG. 31

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CTCACCTACTGCCCTGAGTCAGTCAAGGTTCTGGCAAGGAAAGGAGAAATGCCTGACAGCAGCTGCAAAACCCCTTCTCCCTTTTGGCAGC
AATCAAAAGATTTTGAGGAAATCTAAATAGCTCTCATCAGGAAATGTGGAAGCCCTCCAGCTGGGATCTTCCCTGGTGGCTTGT
GAGCCTGGCCATCTGGGAATAGAGACACTAGATAGCACTCATACACTCTTCAAAAACACATTAATCATATGTAATGTTTGAACATCTG
GGTAAACCACTACTTTTCAATTTATAGCTAAGAAAACCTGGGTTTGAGATGTTTGTAAATTAACATGTTACTCCAACTGTAATGAATG
AACTGAGATAAAGTCAGCAGATGTGTGACCGGGGACCCAGTGATTTTCTGCTTTTCTCACTTCCCTGAAACCTCCTGGCAAGGAGGACA
GGGTATACAGCTTTAAACAAGAAATATTCCTTAAATCTTATTGTACAAAATTCATTTGAATTTACTCTTAAAGTTTGAGGCACTCAATTAGAAA
ACTAGTAGAAATTTTGTATTCTTAAATCTTATTGTACAAAATTCATTTGAATTTACTCTTAAAGTTTGAGGCACTCAATTAGAAA
GTTAATCGGAAAAAAATCTGTTTAAACCTGAGTATCCCTCCCTAAATTAATTAAGCTTAGAATAAAGGTCACTTTAGACAAAT
ATGAATTGGCAAAATATGGTGTAGCAACCTAGTCTCCAGTATTGAGCCCCACCCATTTCTCAAGAGTACTGCTCAGTGGTGACCCAGC
ATCTCACTGTCCCTTCTCCACCCCTCTTATTAATATTAGTGAGACTATCTGAAACTTATTAAGTAGGAAACCCCTAGAGAAGGTT
AGAGTGACTTGACCTCCAAATCAGGTTTATTTGTATGTGTTTAAATGAAATGGGGTCTTGTCTATGTTGCTCAGGCTGGTCTTGAAC
CTTGGGCTCAAGGGATCTCTGCTCACTTCCCGAGTAGCTGGGATCAAGGCACTAGCCACCATGCTGCTCAATGCTAGCAGGAAACGGAAAGG
ATAGCGCTTTTGATAAACTGTCAACTATAGGAATAGAGTTATAAGCGTGAAATCTGCCAGTTGGTACAAATGCTCTAGCAGGAAACGGAAAGG
CGTCGATAGGATATTCCTTAGGAATGTTTACTAGACAGAGGCTACTCTTCCATGGCAATGTTTCACTTCCCAAACTTGGGACCTGTG
ATTTGGTAACTGTTTTTGTCTCTGCGGCACTAGGTATAATATAGATGCCCTTGTGTTAGCTCATTTAAATGCAAAAGACCTTGAGAAAT
ACAGATGTCTTGCCATATGATAATGGATACTAGGTATAATATAGATGCCCTTGTGTTAGCTCATTTAAATGCAAAAGACCTTGAGAAAT
AGATACTATATTCTTATTTTGCATAATGAGGAGACTAAGGCTTATATGTATTAAATGTAATTTGGCCCAAGGGTACACAGCCAC
TGTAATTTGGAAATTTAGGAATTTTGGCTTATGAGGACAAATGAGCAGAAATATGTAATAATGGGACTGATTGAGAAATCTCTGG
AGGTATGTACTTGGCTTGGAGAAACACTTT
GCACGATCTTGGCTCACTGCAACCTCCGCTCTCTGGGTTCAAGCGATTTCTCTGCTTCAAGCTCTGAAAGTGGCTGGGATTTACAGGCCACC
CACCATCATGACCACTAAATTTTTTGTATTTTCTAGCAGAGACAGGGTTTTTACTATGTTGGCCAGGCTGTTCTCAAACTCTCTGACATCAGG
TGATCCACCCGCTCCAGCCCTCCAAATGCTGGAAATTAAGTGTGAGCCCACTGCCACCTGCCGAAATAACAAACCACTTTAAGATGTTA
GATTCAGCCAAAGTGAATGGCTCATGCTGCAATCCCAAGCACTTTGGGAGGTCAAACCTGGGAGATCACTTGAGGCCAGGAGTTTGA
GNTCAGCCTGGGNAANTGGTGNAACCTCCGTCTCTANTANAACATACAAAAATTTNGCCCGCATGGTGGCACCGCACCTGTACTCCACGC

FIG. 3U

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FIG. 3V

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FIG. 3W



TCCCCTAGCCAGACAGTACACAGAAGCTACCGCAGAGGAGACACTGTCTTCCACAGATGAGCAAATGTGGACTGTATTATCAAGAATAGTGT
AGGCAGGCGCTCTACAGCATTGAATGTGGTTTCCATCACTTTCTGGACAGGTAGTTGGTGAGGAATAAGCCTACTATGCCCTCTAGAAAAA
TCTGCCATAATGACTTGACACTTTGAGTTTGTGCCCTTGTGGTAGGCAAAATAATGACTGCCACAAATATCCCCACCTAATATCCCCCAGAA
CCTGTGAATTTATGTTATGCGGCAAAAGGAAAGTAAGGATGCAGATGGAATCAATTTGTTAATCAACTGACTTTATTTTATTATTATTATT
ATTTTGTGAGACAGAGTCTTGCTCTGTCAACCAGGCTGGAGTGCAGTGGAAATGATCTTGGCTCACTGCAACCTCCACCTCCGGGGTTTTA
AGTGATTTCTCTGCTCAGCCTCCGAGTAGCTGTGATTAACAGGCACCTCAACCATACCTGGCTAAATTTTGTATTTTGTAGTAGAGGCG
AGGGTTTCGCCATGTTGTCCAGGCTGTCTCGAACTTCTGACCTCAAAATGATCCGCCCACTCCGCTCCCAAAGTCTGGGATTTACAG
GCATGAGCCATCATGCCCGGCTCAACTGATTTTAAATAGAGAGAGTATGCTGGATTATCCAGATGGATTCAAATGTAATCAACAGGCTC
CTTAAAAGTGGAAAGGAGGCAGAAAGAAATTAATAGTAGCAGCCCAAGAGAGGACTTGGCTCGACTTTGACGACCTTGAAGACACAG
AGAAAGGGGCCAGGAGCCGAGTAATGTAGGTGGCTCGAGGAACTGGAAATGGTATAGAAATGAATTTCTCTCTAGAGCCTCCGCCAAAA
AACTAGCCCTACTGACATCTTTTTTTTTTTTTTTTTTTTTTTTTTTTGTGAGACAGAGTCTGGCTCTGTCTTCAGGCTGGAGTGCCAGT
GGTGGATCTTGGCTCAGTACAACTCCGCTCTCTAGGTTCAAGCGATTCTTCTGCCCTCAGCCACCTGAGTAGCTGGGACTACAGGCACT
GTGCCACACGCCCCAGCTAAATTTTGTGCAATTTTTTTTTTTTTTTTGTGAGACAGATGACATCTTGATTTTAGCCTAGGGAGACCCACTTCCAGACT
TCTGACCTAAAGACCAAACAATAATGAATTTGTGCTGTTTCAAGCCACTGAATCTGTGGTAGCTGTAGCAGAGACTAATAATAATAGTA
ACTGACCAACATTTACTGAGCAAGTTCCGTGTGGCAACCTTCAATGGATGGGCTTATTGGTCAATGATTTGTTTAAAGGGCCAAAAATTTAGA
AAAAATAGCTAAACACTGAATTAATGAACACAGGAAAGGAGAGCGGAAATAAAAAGAAATCAGAAATATCTTTGATTAATTAATGCTATTTTT
GTTGAGTATAGGTTCAATTTTGTCTCATATTTCTTTTCTCATCTTGGTCTTTCTTGGAACCTCAGTTCCTGAATCTGTGTAAGCGAATAGG
TCCAGAAAGTAGCTCTTGGAAATTAATCTTCATTTGCTTTATGAATCCCTGGAAAGGAAACAGATGAGATTGAGTTCTACTGTAGCTTGACC
CGTCCGGGGCGGAGACCTGGTTCTAAATGCTGCCCTTAGAGAGTGTAGTTAAACATTAATTTTCGGTGGGAGAAACAGACAGGCGAGG
TGGGAGAGTAGATGATTTAGCTCAGTGACTGCACCTGGAAAGTAGCTCCCTGGAAAGGGTTCTGAGGTTCTGTCAAAGGCTAGACTAAAGCGAG
GTGATGGAATTGCTGTGGCTGCAGGATGGGGAATTAGTGTCAATATGGGCTAGAAATTTGTCACTCTTGGTGTACATACCAGGTAATTA
TCTAGATGCTAGAGATAAAATGATGATTAATGACACAGCCTCTGACTTCCAGGAGCTCAGTCCAGAGAAAGGAAAAACAGATTAGTGAACA
ATTACATCACCATATTGTGGGTAAATGGCAGAAAGGATATGGAAGAAATGACAAGATTAAATGGCAAGACCAAGTCCCTTCCCTCAA
GAGGCTTACAGTCTAATGGAAAAAGATAAGAAAGCAACACTACATAAAGCAGGAATTAATTTCTACACTGGAAATTTCTCACAGGGGGCTA

FIG. 3X



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TACAGGGGCAAGAGAGGGTCCAGGAAGCAGCTGGGAGAACTGACTTTCCTGCTGCCAACGAGGGATGGGTGCCCTTACATGCCATTCT
ATCAAAACAGTGTCTTCACTGTGTTTTAAACTATGGACTTTTGCAATTTATCTCAAAATAAAACGTTTTCATTTTTTAAATGCTGAGGATTTTAAT
ATGACAGAAAATCATCAGGTTGTAAAATTAGTAATACATGTTTCCCTAAATGTCAAACACTCTATTGGGAACCGCCAATTTTTCTGTGTGGATA
GACTTCTCTTTTACACATATTTTATATGATGTGTTAATTCCTCCTAGGGGAAAAAACTTCTCAAAACTTGATTGGCTTTAGATATATTTTCTCT
AAATCTTTGACCCCTGTTCAATAACAGTATATGCATCTCCACACACACATATCTGCGCACACATATGTGTGTATATATATGTGTGTGTGTGT
TGTGTGTGTGTATATACATATATATGAGAAATGCAAAAAAGAAATAGTAATAAAAAATTAATAAGAGTTTTTTAAAAATACAGAAAAAGTCCAAAGAGAAA
TTCTAAATATCTTTTGAAAACCTTCTTCCCAATTATAGCTTTTAAAAATTAATAATTAAGAGTTTTTTAAAAATACAGAAAAAGTCCAAAGAGAAA
AAGTGGTTTCACAATCACCTATTTTACTTAATCTTATTCACATCAGAAAATCTAATGATATAAGACAAATGATTTTTTAAAGTAAATCAAAATA
TATAAAAGAAACAAAATAAATGAAGCTGCCCTCTCCTTATCAACTCCCTCTTCTAAAGATAGTTATTAATAATTTCTTTCATGACT
CCTCCTAGAAAAATAAAATTACATGCATTAAATATATGTGTGTATATACTACTAATAAATTTCTAGTAATGAGATTTCTTGGATTCAAGAGT
GTGCAATTTTTTAATAGCTGTTCAGTTGTCCCAGGAAATTAATGCAACCAACGTGCATTTTCTGTGTCTAAATATAGGAAAAAAGGCCCAAGG
GGGTGGCTCATGCCCTGTAAATCCCAGCACTTTTGGGAGGCCGAGCGGTGGATCAATTTGAGGTCAGGAGTTCAAGAAAAACCGGCCCTGGAC
AACATGGCGCAACCCCATCTCTACTAAAAAGTACAAAGATTAGCTGGGCTTGGTGGCTCTCACTGTAAATCCACAGCTACTTTGGGAGCCCTG
AGGACGGAGAAATCACTTGAAACCCGGAGGCAGAGGTTGCAGTGAGCCAAAGATCCCGCCACTGCACCTTTAGCCTGGGCAACAAGCAAGAC
TCTGTCTCAAAAAATAAAATAAATAACATACATACATATAAGAAAAAGATTTTGAAGAAGCACTGGTAAGAAAAAAGCTGCGGCAATTGCT
TCCACTTCTTCAAAGTGCAAACTCTTATGACACTAAACGTGTAAATGTATTGTTCCTGTAGCTCTGACCAAGTGTTCAAAATTTTCATGAAAAATGCCAAAAAAT
GATGTTACCTGGGCAGGACAGAGGACTGTGTGGGGAACCTTGACCACGAAATTTGTCAAGATGTTTCAAAATTTTCATGAAAAATGCCAAAAAAT
GTGAGGCTCACCTATCTGAAGGTAAATAATTGCTATTTTGTATTTTATTTCTACTTTTAAAGTTCTCAGGTACATTTTTGTATAAAGTTTCTG
GTGCCACAAAAGAAAATAGCACTCGAATATAAAAAATTTTCTTTTTTAAATCTCAGCAAGGAAAGTTACTTCTATAGAAAGGTGGGCCCTTAC
AGATGGAGCAATGGTGAGCGTGCACTTGCCAAAGGGAGGGGAAGGGGTTCTTAAACCTGACAATGCACGCTGGGCCCTGCTGCTGTGTGTGT
TCCCCTATTGGCTAGGTTAGACCGCACAGGCTAGACTAAATTCCTCAATTGGCTAATTTTAAAGAGAGTGAAGGAGTGAGTGTCTGGAGGG
AAAAATCGTTTATGACAGAGCATGTAAATCGGAATGAATCAGGGCGGAGCGGTGTAATTCGGAAATGAATCAGGGCGGAGCATGTAAATCGGAAT

FIG. 3Y

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FIG. 3Z

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GAATCAGGGTGGAGCGCTGTAATCGAAAAAGGGTTGCTTTTACGAGGAAATTAAAGTTTAAAGTAGAAGGCAAGAAATGAACATACACTGACA
TACTGATTTCTTTGGAAAGAAATTTAGAACTCACATCTAAACAATTTTATAGGTTTCTTTAGTTATTTCTGGAACAGAGGACAAATAATCTCATTT
CTCACAAGCATAGTGGATTCAATTTGCTTTCTCTCAAGCACTTTTTCAGAGGCTCATTTCCATCTGGGGGGCTTCAATGTAGGTTTATATA
ACTGGTGTTTTGTGTTGTTTATGAGACAGAGTCTTGCTCTGTTGCCCCAGGCTGGNGTGGCACAATCTCGGCTCACTGCAACCTTCC
A CCTCTCGGGTTCAAGCAAATTTCTCTGCTCAGCCTGCCCCAGTAGCTGGGATTAAGGCAATGTCACCACTCTGACCTTTGTGATCCGCCCCACCTCGGCTTCCCCAA
GTATTTTATAGTGGGACGAGGGTTTCAACATATTGGCCAGGCTGGTCTCGAATCTCTGACCTTTGTGATCCGCCCCACCTCGGCTTCCCCAA
AGTCTGGGATTAAGGCAATTTCTCTGCTCAGCCTGCCCCAGTAGCTGGGATTAAGGCAATGTCACCACTCTGACCTTTGTGATCCGCCCCACCTCGGCTTCCCCAA
AATTCCTTAATTTGTTCTGTTGATTTTATGATTAATGACCAACAACAATTTGTGTGCAAAAGAAACCTTGAGCAAAATTAGCGCAA
CTCCTTCTCTTACCCGCAAGCAAAAGAAACCCCTGCCCCCAACCATGAAGAAACCTTTTCAATTTCTGTAAATCAAGTGTTAGACAAAGTG
AAATATTTTGTGAAAGTGGCATTTGGCTCTTTTCCCATTTGGTGGGTTAATGAACATAATTAGCAATTAATAAGGAAAGTGGCTTCTCTC
CCAGCCCCAGGAAATCTTTTCCCTCCCTTTCTAGTTCTTCCCTCAGGAAGGAAATCATTTCTCCCTTTCTCTCCATCCCTCCCTCATTTT
CCTTTCCCTTCTCCAGACTAAAGTCACTCTCTCAACCCCAACCCAGGGCCAAATTAACAATTTTCTTACATAAACAAGAGCTTTTGAATTC
CTATGCTTCTGCAATTTATCTCACTAAAGCCCTAAGGGAAGGAAATTTTCAAAAGTGTGACTAATGGCTTACAGTAGGAATTTGGAAGAT
ACAGAAGGACAGAAATCAACATGTCTAGTAAATTTCTCAACAACATAGCTAGAGATTTGGGGCAAGTCNTTTATGCTGTCTAGGCTTCAAGT
TGAGTAATTTGTAAATAAGGACCCCAAGATAATCTTTGGGTTCTTAACAAATTTCTCTGTAAACAAGTGTCTCCAGCTTCTGGCAAC
AGGGACTAGATTTCTGGAAGACAATTTTCCAAAGATGGTGGGGCAGGGGGCAGCTTTGGGGATGATCATCAGGCATTAATTTCTCTCTAAG
GAGCGCTCAACCTAGAACCTTTTGCAATGCAAGTTCACAATAGGGTTTGTGCTCTCCCTGAGAAATGGAAATGCCCTCCGCTGATCTGACAGCA
GGGGGGCTCAGGCAGTCAATGCTTGCTCACTCTGCTGTAAGCTCTCCCTGCTGTAAGAGGCTACAGGCTGATATGGGT
CCGTGGCCCCAGGGGTGGGGACCCCTGCTATAAAGGAAGTTCAGAAATCAGATTAATAATTTCTGATTTTATATAAATCAGAAATTTATAA
AATTCAGATTATAATTTACTACCAAGTAATAGCTCTTTTGGCCCTTAACCTTCCCAAGAGACCACTGGAGTAATTTATATCAACGCA
AAGAAACAAAGCATGCTCAGTGGAAATCTCTGCCCCCTCTCTGCTCTCTCTCAATCTTAACAGTGAAGCAAGTGTGCAACAAATCGC
GCGGTTCAAGAAAGGGAGGATGGAATTTGTTACAAACCGTTTCTGCTGCCCCAGGCTGGAGTGCAGTGGCGCGATCTTCTGCTCAGTGA
CCTCTACCTCTGAGTTCAAGCGATTTCTGCTGCTGCTCAGCCCTCTCTGAGTAGCTGGGATTAAGGCAACGCGCCCAACATACCTGGCTGATTT
TTGTAATTTTATAGATGAGGTTTTCACCATATTGGCCAGGCTGCTCTCGAACTCTCTGACCTCTGKATCTCTCCACCTCAGCCCTCCCA
AAGCGCTGGGATTAAGGTTGTAGGCCATCGCGCTGGGCCAAACAAATTTGTTTACAATGTTTAAACAACATATAATCTCTAAACATATTGGCTT





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FIG. 3AA

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FIG. 3BB

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ATATAATGCTCTGAAATATCAATGATTCATATTATCAAAATATTTGTTTAAAGTCACAGTTGCAAGGTTATATACAGAAGCATAGGTT
TTTATAACAGAAAAATAGACACTTAATATACTGACCTCTTACAAAAATAGTCCTGCTCAAGCATCCCATCTATGTATCATTAACATCTA
TTTCTTTCTACCCAGCTAAATAGTTTATTAATAATCCTTGAATGTCACAAGTNGAATACAGAATAAATCAGATAATACATTAATAATGC
ACCTGATAAATCAATATGCACCAGATAATGGACACAGTATACATCAGATAATACAGTACAAATTCNAATGAAAGTTTAGTGTGCAAAAGGT
AAAAATGTAAGAATGTCTTAATGTCTCCCATGCTCTTAAATTCAGGTCTTTGGAGGCTGAGGCGAGGTGAATCACTTGAGGTTAGGAGTTTGAGA
TAATAGGCCAGCCATGGTGGCTCATCCCTGTAAATTCAGGTCTTTGGAGGCTGAGGCGAGGTGAATCACTTGAGGTTAGGAGTTTGAGA
CCAGCCTGGCCCAACATGGTGAACCCCGTCTCTACTAAAAATATAAAAAATTAAGCCAGGTGTGGTGTGTAAGCACTGCACTCCAGCCTAGGTTG
TCCGGAGGCTGAGGCGAGGAGATCGCTTGAAACCCAGAAAGCCGAGGTTGCAGTGGGTCAAGATCAAGCAACTGCACTCCAGCCTAGGTTG
ACAGAGCGAGAGCTTTGTCTCAGGAAAAAAATAAAATTTCTCAGTCACTAGATTGAGAAATAGAAATTAACCAAAACAGATAAAGCCCCA
CTGTGTTCCCATCCACATCAGATTCACTTTATCTCCTCAAAAGGAAAGTGCTATTTTGAATTTAGTATTAATTAATTTCTTGCATTTCT
TCCTACTCATATCATGTGCTTATATATATATATACAAATGCGGATATCATACATAGCAATGTTTACATTTTCGATTTTTCGATTT
GTCAAATGTAGAAATTTTAAACTTAAAAACATGCTTTCATACAGCGGGTGTGGTCTCATGCTGTAATCCAGCATTTTGGAGGCA
AGCAGCGCGGATCGACGAGTTCAGAGCCAGCCTGACCAACATGCTGAACCCCATCTCTATTAAATAACAAAAAATA
TTAGCTGTGTCATGGTGGCGGTGCTGTAAATCCAGCTACTCAGGAGGCTGAGGCGAGGAAATTTGTTGAACCCAGGAGGCGAGGTTG
CAGTGAGCGGAGATCGCACCATTTGCACCTCCAGCCTGGGTGACAGAGCGAGACTCCATCTCAAAAAAATAAAAGCTTCATACAAA
CATGAACCGGGCACAATGTCTGGCTGGGTGGCTCATGCTGTAATCCAGCACTTTGGGAGGCGCAAGGGCGCAATCACTTAAAG
CCAGGAGTTTCAGAGACAGCCTGGTCAGCATGGTGAACCCCGTCTCTACTAAACTACAAATTTAGCCAGGCATGGTGGCATGGCGCT
GTAGTCCAGCTACTCGGGAGGCTGAGGCGACAAAGTATCATCTTGATCCAGGAAGCAGAGGTTGCACTGAGCCAGATTTGTCTCACTGCA
CTCCTGCTGGGTGAACAGAGTGATCTCTGCTCAAAACAAACAAACAAACAAACAAACAAACAAACAAACAAACAAACAAACAAACAAAC
GTCAAAATGTTAAATTTGACTATGTAACTTATTAATGAAGGAACCCAGCAGGCTGTAGAGCTGGGTCAAGAGTATAAGAGAGACTGGAG
TGCTTACAGTCAAGCAGAGACAGAAATGCTGAAGGTTATGAATTTAGATATGTAGTTAATTTGAAAGGGCAACTAAACTGTAAATC
TTGCCATTATCTTTCTATCAGACCAAAATTAATTTACATCTCTACTAGACAAACATTTTGCCACTTTTCAATCCATTAATCTATGGGTAAT
TTCAATGGAGTCTGGCCCTAATCAACAGTAATAGTAAAGCCCAACAAAGGATCTCTTCCCTAGACCTTGAAGTGTCTTTGGGTGGACCC
CTTAGACAAATAATTTAGTATGACATTTGAGAGGACACCGCAAGCCTGGGCGAGCATAGTGAGACCCGCTCTACAAAAAATAAATAATTAG

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CCGGGCATGGTGGTGTGAGCCCTGTAGTCTACTCAGGAGGCTAAAGGTGGAAATACCACTTGAGCCCGGAGTTTCGAGGCTGTAGT
GAGCTATGATCATGCCATTGCACCTCCAGCCCTGGGTAAACAGAGCGAGAAACCTGTCTTTGAAAAAAAAGAAAGAAAAAGAAAAACA
AAAGGAAATGCAGCCCATTTTTTTTTTGGCCTTATTTCCAAAGTCTCGATAAATTTTTTCTTTTTTAAACAATATAATATTATCACTTATGTA
TTCTTTTGCATAATGGCCTTTTCACTCAGTGTATTTGCAAGGGGTAGCCATGTGAATGCAATGTGCTTTTCAAGGTATTGCTATTATAACAACAATC
GTATGTTGGTCTATGTAGGCATATCAACAATWTATYCATTTCCCTAGCTGAAGTACATTTGCTTTTCAAGGTATTGCTATTATAACAACAATC
TCATAACCTTTAATCAAAATAATAATTTTTGTCTCTTCAATCAGCTNTGATTTTACTTTGTTTCNAANACNAAGCACACAACACTATAAATTANAAT
TTCAATTACTGATAAATAATAATAATTTTTCCAAAACATCACAAAATCTTTNTNTNINCACATTTTACTATACACTTTNGGCTCTNAATTTTAA
AGCGGCTTCACTATAATGTGGTTCTTTTTCTCTCTTCCCATACTAATTTACTGGTACTGGACATATACATCCAAAAATCAAAATAGTARTGTC
CTTTTTAAGGGATAAATGGGATGTGATGTAGAAGGGGCATAGTAGGGACCTTCATCTCTGTTTGGCAAAATTTTTTCTTAAATATAGGTGGTA
GGCATGTGGAATTTATAACAATAAGTTCTGTCTCCAGCCAGTTTCTGTTCACATAAAACCATATAAATTAACAGTTAACTGGATCTGGTT
TGACACAGATGTAGACGATATTAATAATTACTCCAGAAACAACAGGCATAACTAAAACTACACAGGCAAAAGGGGAAAAATAGAGAAATG
TAAGGGCTGGGACTTTAAGCCCATGTTGCCCCACTCCAAAGTTTCATGGACTTTTTTCTCTCTCCACATTACTTTCTCTCTGCTAGACTGT
CCTGAATGTACTCTCTCTGCACACAGAAATTAGACGAGGCGATCAGGTTGGTCAATGTATCCAAATCAGCAGTATGGCCAGATTTCTCCAGAT
GACCCGGAAGCACCTTGGAGGACACCGCCCTATCTGGTGGAGAAAGATGAGAGGGCAATTTGGCTGGTGTCTGAACCTGGCNAACCGAGGCC
CAGAAACAGAGATCATCTTTAATTCMAATACAGGTAAAGGAGAGACCCAAAGAGCAGATACGGAAATGACACCGTGCAATACCTTGATTTTCAC
TGTTAATTTACTTATGAAATGTGTCTGAATTTTGAAAAACAAGCTGTAGGAGGTATTTCATATTTTCCATTTGTGATTTGCCCTTCAGGCTGACTT
GATTTAAAGTGTATGGCTCTTTAGAAAAACAAGAAAGTCCATAAAGAAATCAATTTAAACACAAAAATCTTTCTAATCTAGAAAAAG
GCTATTTCTGCTTAGAGTTATAGGGCTATAACTGATAGAGGTAAACCTTTGAAGAAATATAGGCCAATGTAGGTTTTTAGGAGAGAAAGACTTA
CAAAATAAGCAATTTGAGTTTCAAAATTTGACTCTGAACCTTACAGCTGAGTAAAGCTTGGGAAAGTACCTCAACCAATTCCTAGGCCCTCAG
TGTTCCACCTGTAAATGTTAACAATCATAGCTATCTTAAACGTGTACACCTATATAAGTGAATTAAGTATTAAGTATTAACAACAAGAA
GCTCTGTAAATATAGCTCTTAATAGTTGTGACACAAATAAAGCCACTGAGTTATCTTTGAGAAATTAACATTTATATGTTACTCGTCAAC
ATAAAAAATACATTGCCAGCTGGCGCAGTGGCTTATGCTGTAAATCCCAAGCACCTTTGGGAGGCTGAGGTGGGTGATCACTTGAGGTCA

FIG. 3CC

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FIG. 3DD



GGAGTTTGGAGACCAAGCTGGCTAAATGTGGGGAACCCCGTCTCTACCAAAAAACATAAAAAATTAGCCAAAGTGTGATGGCACACACACTTGT
AATCCCAGCTACTCAGGAGGCTGAGGCAGGAGAAATCACTTGAACCCGGGAAGGCAGAGGTTGCAGTGAGCTGAGATCGTGCCACTGCACT
CCAGCCTGGCGACAGAAAGGAGACTCTGTCTCAAAAAACAAAAATAAARACATAATTGCCATCTTAAATTCACCTATACCATGACTC
CCAGATTCAAGTCAATAACTTTTTTGGCATAAACATGCAAGTGACTTTTTCTTCCTAAGACATCCCCCTCCAAACACACACACATTAACCTTAAT
CTACAAATGCGCCAGGCTAGTGAATTCCTGATGAGGCTGGTTTTGAGGGTTCCCAAAAGACTTGGGATACAAAAATTAATCTGGGCAGAGCA
ATTGAAGATGCAATATTCTGTGTGTAGTATGTAGGTTATGTGTGGTGCCCTATCCAGATCCCTGGGGATCCCTTTTACCAGCTCCCACT
GGTGTGGTGTGCTGCTAACTGCTTATCTCTGAAAACTTTCTCCCAAAGATTGCCCTTGGAGCACTTATGCCCCAGAGCTTCTCTGCAAG
ATCAGGGCTGAGGCTAAACAGTCACTCTGAAGCCATATCTCTGCTTAGCTTCTTTCACCTTCTCTAGTTTGTCTTCTCATCCCTTAAAAAGT
TGCACTTGAGAGCAATCTTTTATAAAACCACTTCTGTGAGAAATCTCAGGCACTGCTTAGGAAAATTAGACTTATGGCACTTCTATAAATCCA
GCATTTCCCTCTTTTTTCAAAACTACAAAGCTGTGGATCATGCCCTGATTTGAGAAAATAAGTTTAGAAAAGTCACAGCAAGCTCATTAATAAA
ACAAATTAATAAACCATACAAAAAATAGAAATAGGACAAAGTAGAAAAATATTAGCATGCATTTGCATTTTCATNAAGTCATATGCACATCATG
GAATTTTCATTTCCATTTTGTATGTGTATATGTGTGTAAACATATATACACATATGTAGACATACGTGTGTGTTTTGAATCATGATGTC
AGTGTATTCATTACTGCAGACCACAGCTCAAAGGGTTTTGAAAGCCACTGTTCCAAATCCCTGCGCATATATAGACTTTTAAACGAGGAAAAAGTCTTTGTA
GATTACACTTGAGGAAGGTAAAAATTAATTTCAATATATTTTGATCATCCTCGCATATATAGACTTTTAAACGAGGAAAAAGTCTTTGTA
TTGAAGAAATAAACTTGAAGAAAAATTTTAGCAGTGCTTTTCAACCTTTAGAAATCTACAGTCAATATTTAGTTGTTTTTACCATTGTCA
GTATTTCTATTTCTGTGCTTTTGAATTTACTTCCATTTCTAGTGTCTCTAGAGTAACATATGAGTAAATTAAGGTTTTTACCATTGTCA
CAAAGGCACCTTCTATATAAAACCTCCACATAAAAATAAAATTAAGGTTTTTCAATTTATACATTTTTTATAACAATTTATTAACCACTTAAGAG
CATTTACTGGGTGTCAGGCCAATGTTCTAAGACTTTTCCATATATCAGATCAATTAATACCTCAATGACCCCTATAAGGGAAGTAGAAT
TCTTTTCCCAGTTTTTCAAATGAGGCCACAGAGGAGTTAAGCAAATTTGTCTGAGCTCACACAGCTAGTAATGGTAGAACTAGAAATTTCA
AACTCAAGCAGTATTTCTCTAGAAATCAGTGAAAGTAAACCACTTTTGTCTAAACTGCTGAAAGAGAGCCCTTATGAAGAAATATACAAATTTCCAGCAAGTGAA
CACCATGTAAAGAAAAAGTACAAACCCCATAAAAATAGCAAGTGCTGAAGAGAGAGCCCTTATGAAGAAATATACAAATTTCCAGCAAGTGAA
ACGGTTGTGGTCCCTGGTTGTATATAGTTACATGGGTGTGACTTTTACAAATTTATTTAAACCAACATAAATACCTTTATGCAGTTTTTA
TGTATGTTATACTACAGAAAGAGAGGAAAAATTTTTAAATCATTTCTTTAAGGTTACATCAAGTTGCGTATCAGTTCAGTTCCATT
TAAATGATTCAAATCAAAAGTCTGTGCATTTGAGAAATTCATTAAGAGAGTAACATATGTTATTTCATTAAGAGTAAACATAAATTTTGGCA
TTGATTTCTGGCCAAAAATCACACCTACAAACCATTAATTTGTAAAAATTTCTAGGAAAACTCAGTACAAAACTTGGTGCAATGCAATAAAAGTTT

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GTGGCAGACAGTAATACTCAGCAAAACATCCACCTCCTCTCTCATATTTTCCAGCTCCCTTGTGGTTAAACGTTGCCATGTGGCAA
GTCTGGCCAGTGAAGCGTGAGCAAAACTGAAAGGGTTCTTTGTAGATTGAGACAGTGAAGAGCCTATGTGTGCTCATCTATTTCTCTT
TTTCTGCTGAGGGCACAAGAAAGTCTCTGAAATCATGTGCTACAGCTATGAGATAATGTGCTCTTGGCTTCCCTACAGGCTTCTCAGTGTTTA
CTGGTGTGGAGCCCTTGTAAATGGACACATAACATGAACAAGAAATAAATCTTTGTTCATGAAGCCCTAGGAATGCCAGGACTAAATCTG
TTACCTCAGCACAAACCCAGGCCCTATCCTGACTAAGGTGGTATTAATTAATTTCTCAACAAGATGAACAATGATGACAGACTTAAGCATTTCT
ATAATCCTTCTTCTGTAGGTAGTTCCAGGATTTCTATGNAAGNAATAATTTCCAAACAGATGAACAATGATGACAGACTTAAGCATTTCT
GCCTTCTCTTAATTTTCACACTCAAGATCCCTCTTGAAGNAAGTGTCTGAGAGTTCTAACTTCTCATTTGGCTACGTAGTGGCAAAAGCTCTAC
AGCAATTTTAAGGACATTTTAAACCTGGTAAAGCAGAGTGCCTGGTTAGGAATGCCCTTGTTCACAGGAATAGTTAATTTCTCAAAAGGGA
AAAAACAAACCTTGTTCAAATAACCTGGAAACATGTTTAACTCATTAATAAAGACATGAACAAACAAAGATGGCATTTTCTGCTT
TCAGATTTTGCAAAATTAACAAACCCAGGAAATCCTGATAGGAATGTGATGAATGGGAATTTCTCATATATCATGTATTTGGTGGGAAC
ATAATTTGGTTTGTGCAATTTTGAAGCTATTTGATTAATGATATGAAGAGCCATAAATTTTCTTTTGATATAATAATTTCCACTTCCGAA
ATCAATCCTAAAGGRATAATCTAAATTTGATGAAMAKTCTCCCTCCAGATCTAGATTTGAGCATTTAATTTAAATTTAAAGTTGGCC
GGCCGCAAGTGGCTCATGCCCTGTAATCCAGCACTTTGGGAGGCTGAGGGGGGGATCAGAGGTGAGGAGATTGAGACCATCTCTGGAT
AACACGGAGAAACCTGGCTCTCTAATAAATAAATAAATTTAGCCGGGCTGTTGGGGGGCTGTAGTCCAGCTACTCGGGAGGCTG
AGGCAGGAGAAATGGCGTGAAACCCGGGAGGCAGARCTTGCAGTGAGCAGAGATCGCGCCACTGCACCTCCAGCCTGGGGCAGAGCAAGA
CTCTGTTTAAAAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAAATAA
TGTGTAAAAACAGAGAAATGATTAAGTAKATTAATGACTAAATACACTCAATAATTTTATGAACGTTAAAAATATTCAAAAAATTTAA
ATAATGACTTGTCTAACTTTAACAAAGAGCTTTATATCAGCTAGTCTTTGGAGGTAAATAGTATTAATCATGATTTTTCAGAAAAAGATC
CTGAGGCTCAGTGTCCAAAGGTCCCAATGAACCTAATCAGGTCCGAGGTGGTAGAGCAGCATGTGGAGCCAGTCTCTCTCCGACTCCATCA
TCACACTGCAACGGCTTCCCTGTTAAGATAATTTGCTCAAAAAAATGCGAGATATAAAAAATCTGGGTAAATATGATCAACCTTTAAAGAAATAAT
ACATTTTAAATTAATCATGAGACCTTTGTAGTGGTCAACATCAATGTGTAAATTAAGCCAGATGTGACAGGATTTGTGGCTCTCCCTT
TACTTCTGAATTTTGGAGGCCCTTTTTTTTTTTTCTAGTTGTATCAGTCAGGCCAACCAATATCTTTTATGACATCTACTAAGTTTAGATACG

FIG. 3EE

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FIG. 3FF

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CAATGCTGCAGTACCACTTCTCTCAAAATGCTAACTGGCATTTCAAAATTTTGGAGACAGTCTCTCTCTGTGCCCCAGGCAGGATTGCGAGT
GGCATGATCTCGGGCTCAGCGCAACCTCCACCTCCAGGTTCAAGCGACTCTCATGCTCAGCCCTCCCAAGTAGCTGGGATTACAGGTGT
GCACCACCAACACTTGGCTAAATTTTGTATTTTATAGTAGAGATGTGTTTTACCATGTTGGCCGGCTGGTCTCAAACTCCTCGGCCCTCA
AGTATCCTTCCACCTCAGCCCTCCCAAGGGCTGTATTA CAGGCATGAGCCACTGCTGGCTGGCATTTCAATTTTAAATCTTCA
GTAATAAATGAAATTTTATCTTATTTGTTATTTTATGTTTATTTATTCATGAGAAATAACATTTTCCAAAGTTTGTGTTTACTG
ACTGAATTTCTTTTGTGTCACCTTACTTGGTATCATGGGATAAATTTTGTCAATTTTCTGATTTATATCAATGCAATTCAGGGTCCCAAA
CCTGCCAAAGTTTAAAGAGAAAGATACCTAAGGGGAAAAACCAGGAAAGATGGTAGAAAGAAATCACCCCTGGCATTTTCAATCACCGTAAA
CAATTGCTAGGTGCCCTAGCTGCAGGTATACAGCTCACTGAAACATGAATTTCCAAATTTTATAGGGTGAAATATATATTTAGAAACCTCT
TCTGGAACTTTCTCTAGTTATCTAGCATCTCTAAGTGCCTGGAAGTTCTGATTTGGTATGTTGCAATGTGTTTATTTCCCATCCCAAGTT
TCATAGCTGCCGGCCCTGGGATCTACAGTCA CAGGCTGTAAACACAATATCTTGCACATCTCTGAGTCTTTAATAAGCTTTGTAGATGGG
CTCTTACCATCATCATCTGTGAAAGGCAAAATATACAAAATTTGTGACTAATGTAATGAGTCAATGAGTAA CAGAAATTTACTGACCA
AACACTACGTGCATGTAGATTTCAGAAATAACACTTTATTTATCATCAGAGGAAAGAACCATCTTTAGAGGCTCAACAAACCCAGGAAAG
CTGTGACGATTTCTTCAAAATTTGTTAAGAAATATCCATGCTATATGGGTTTTCACATTTATTTGCTACACACAGTACCAATTTTTCCTCCAAAGC
CAACAGCAGGTATTTCTATTA CCCCCTCTGGACTTTTACTCCAAAGAAATAACACTGAGTCTGTGAGTAAATTTATAGTATTTTGTATCA
TTGCTGCTTTTATTTTAAAGGTAAAGAAAGATCTAATGCTATCTCTAATATCCAGTAAAGTAAATTTATCTCTCTCTCTGAGACCTGGAA
ATCCTGAAATAAAAAGGATAATGCAATAAACACAGTTTGCAGGAAAGTATGTTAGCTATATATCTATGAACTCTCTCTCTTACTTATG
TTGAAATGGCTTACCTATTAATCTCAAAATTTGAGTTAAATGAAATTTCCCTCTTAAATAAATCAAAACGTAATATGTAATTTACATTTTCATGG
TACATTAAGTAGTCTTTTGTATATTTGAAATAAATATCAATCACTAGGTGTCTATGTTCTATCA CACTCTACAAACATGTCACTTCTTAAT
TAACAAATGTTCTTCTTCTTTTGTGCTTTTGTGCTTAAATATATATATATATGACTTTTLLTGGAAAAAATCTAAGATTCTATGCTTTG
TTTTGTAAAGACCAATAGGTTCTGTATAGTCTTTTAAATTTGTGGTAAATATACATGCGCATTAATTTTACCATTTTTAAACCATTTTAA
AGTGCACAATTTGTGGCATTAAGTACACTCAOGTTGCTGTGCAACCATCA CACCGTCCATCTCTCAGAAACCTTTTATCTCTCTTAAACT
GAAACTCTGTACTGTTAAGCACTCACTTCCCGTTTCCCCCATCTCCCGGAGCCCGGTAGCAACCAAGACTGTACTTTCTATGAATTTGACTA

FIG. 3GG

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HKNG 1mRNA EXPRESSION IN NORMAL BRAIN

BRAIN REGIONS	GRAY MATTER	WHITE MATTER	NEURON	ASTROCYTES	OLIGODENDROCYTES
FRONTAL CORTEX (1)	+++	-	++	-	-
MOTOR CORTEX (2)	+++	-	++	-	-
PARIETAL CORTEX (3)	+++	-	++	-	-
OCCIPITAL CORTEX (4)	+++	-	++	-	-
HIPPOCAMPAL FORMATION (5)					
CA1	+++	-	++	-	-
CA2	+++	-	++	-	-
CA3	NA	NA	NA	NA	NA
CA4	+++	-	++	-	-
DENTATE GYRUS	++	-	+	-	-
SUBICULUM	+++	-	++	-	-
PARAHIPPOCAMPAL GYRI	+++	-	++	-	-
CAUDATE/PUTAMEN (6)	+++	-	++	-	-
GPI/GPe/PUTAMEN (7)	+/-	-	+/-	-	-
GPI	+	-	+	-	-
GPe	+	-	+	-	-
PUTAMEN	+/-	-	+/-	-	-
AMYGDALA (8)	++	-	+	-	-
THALAMUS (9) MEDIAL	++	-	+	-	-
SUBSTANTIA NIGRA LEVEL (10)	++	-	++	-	-
SNC (SUBSTANTIA NIGRA PARS COMPACTA)	+	-	+	-	-
SNr (SUBSTANTIA NIGRA PARS RETICULATA)	+	-	+	-	-
RED NUCLEUS	+	-	+	-	-
3rd CRANIAL NERVE NUCLEI	+	-	+	-	-
SUPERIOR COLLICULUS	+	-	+	-	-
UPPER PONS (11)	+	-	+	-	-
LOCUS CERUFEUS	+	-	+	-	-
PONTINE NUCLEI	+	-	+	-	-
LOWER PONS (12)	+++	-	++	-	-

FIG. 4A



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HKNG 1mRNA EXPRESSION IN NORMAL BRAIN

BRAIN REGIONS	GRAY MATTER	WHITE MATTER	NEURON	ASTROCYTES	OLIGODENDROCYTES
LOCUS CERULEUS	+	-	+	-	-
PONTINE NUCLEI	+++	-	++	-	-
RAPHY NUCLEUS (MIDLINE)	++	-	+	-	-
MEDULLA (13)					
INFERIOR OLIVERY NUCLEUS	++	-	+	-	-
12th CRANIAL NERVE NUCLEI	+	-	+	-	-
NUCLEUS AMBIGUUS (MULTIPOLAR LOWER MOTOR NEURONS)	+	-	+	-	-
CEREBELLUM (14)					
PURKINIE CELLS	++	-	++	-	-
GRANULAR LAYER	+	-	+/-	-	-
MOLECULAR LAYER	+	-	+	-	-
TEMPERAL POLE (15)	+++	-	++	-	-
CINGULATE CORTEX (16)	+++	-	++	-	-
ANTERIOR THALAMUS (17)					
SUBTHALAMIC NUCLEUS	?	-	?	-	-
VENTRAL ANTERIOR N. (VA), VENTRAL LATERAL N.(VL)	++	-	++	-	-
HIPPOCAMPAL FORMATION (18)					
CA1	NA	NA	NA	NA	NA
CA2	NA	NA	NA	NA	NA
CA3	+++	-	++	-	-
CA4	+++	-	++	-	-
SUBICULUM	+++	-	++	-	-
PARAHIPPOCAMPAL GYRI	+++	-	++	-	-
CERVICAL CORD (ROSTRAL POSITION)	+++	-	++	-	-
ANTERIOR MOTOR NUCLEI	++	-	+	-	-
SENSORY NUCLEI GROUP	++	-	+	-	-

FIG. 4B



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FIG. 5

PEDID	SUBID	PHENOTYPE	NT CHANGE	AA CHANGE	EXON(RENAMED)	COMMENT		
30124	3010189	SCZ	AGA->ACT	Arg331->Thr	8 (8)	BOTH AFFECTEDS		
	3010185	SCZ						
30105	3010027	SCZ	ATT->ACT	Ile23->Thr	1 (3)	THE ONLY AFFECTED		
31102	3110014	SCZ	GAA->AAA	Glu202->Lys	5 (7)	BOTH AFFECTEDS	ALSO IN CR BPI	
	3110003	SCZ						
30120	3010155	SCZ	SAME	SAME		ONE OF THE AFFECTEDS		
30126	3010203	SCZ	14 BP INSERTION	SPlicing	8 (10)	BOTH AFFECTEDS		
	3010210	SCZ	21 BP 3' OF EX10					
			GAATGCCCTGGTTAGAG					
30140	3011486	SCZ	24 BP 3' OF EX6		4 (6)	ONE OF THE TWO		
32301	3210041	SCZ	SAME			TWO OF THE THREE		
	3210051	SCZ	SAME					
30120	3010155	SCZ	CTG->CTA	NO CHANGE	2 (4)	ONE OF THE TWO AFFECTEDS		
32200	3210104	SCZ	SAME	SAME		BOTH AFFECTEDS		
	3210009	SCZ						
32304	3210489	SCZ	2 BP DEL OF T's	?	9 (11)	ONE OF THE TWO AFFECTEDS		
			3 BP 5' OF 3' UTR					
32312	3210775	SCZ	SAME			ONE OF THE TWO		
30138	3011346	SCZ	SAME			ONE OF THE TWO		
							WILL SEQ.	

POLYMORPHISMS SEEN IN EXT1, 2, 3, 4 LOOK LIKE COMMON VARIANTS NOT INCLUDED HERE